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Montana Outdoors

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COVER: Elegant in form and handsome in color, pintails fly across a marsh in northern Montana. See page 12 to learn why these birds aren't faring as well as they should. Photo by Donald M. Jones.

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LETTERS

Missouri's True Source

The article "The True Utmost Reaches of the Missouri" (July–August) brought back some great memories. In 2002 I worked for the USDA Forest Service on the Beaverhead–Deerlodge National Forest conducting fish surveys on many small creeks in the Centennial Valley. We would traverse the entire length of a stream from the very lower reaches to the uppermost source. Surveying Hellroaring Creek was a memorable two weeks. The falls and steep country surrounding the creek made it very difficult to climb while carrying packs, waders, and a backpack electroshocker required for the work. The sense of accomplishment upon reaching Brower's Spring and being able to straddle the mighty Missouri and drink from the spring will stick with me forever. Thank you for this great article. Now I know the true history of that remarkable place.

JON HANSON
Marion

The article on the Missouri River's true source told the story well. There was one error, however, and that was the stated mileage from Three Forks to the mouth of the Missouri at St. Louis. That number is not 2,341, as has been widely quoted in the media for decades, but is in fact 2,321, as determined by the U.S. Army Corps of Engineers and Montana's own Department of Natural Resources and Conservation's "River Mile Index of the Missouri River." Therefore, the total distance from Brower's Spring to the Gulf of Mexico should be 3,768 miles rather than 3,745.

JOHN LARANDEAU, *Civil Engineer*
U.S. Army Corps of Engineers
Omaha, Nebraska

I enjoyed the article about the true source of the Missouri River. However, it's not true, as you state, that the Centennial Mountains are the only range in Montana that run east–west. The same is also true of the Snowy Mountains near Lewistown, the Beartooth Range, and the Highwood Mountains east of Great Falls.

JOHN ROUGHEN
Lewistown

EDITOR REPLIES: *You are correct. And for good measure throw in the Bears Paw Mountains south of Havre, the Garnet Range between Helena and Missoula, and no doubt a few others we surely missed but will be reminded of by other watchful readers.*

Where do they go?

Regarding the article on zebra mussels in the July–August issue: Won't high-pressure washing of a boat at a car wash just send zebra mussels and their larvae into the sewers and then eventually into Montana's rivers and lakes?

CAROL FLAHERTY
Bozeman

EILEEN RYCE, FWP'S AQUATIC NUISANCE SPECIES PROGRAM COORDINATOR, REPLIES: *As far as we know, most car washes in Montana drain to municipal sewage treatment facilities, where the zebra mussels are killed by chemicals. For car washes that drain directly to public waters, research has shown that the combination of hot water and high water pressure from car wash nozzles will kill most if not all zebra mussels and zebra mussel larvae.*

Cost too high

I'm writing to state my concerns over the new Montana Fish, Wildlife & Parks license fees for a resident ewe sheep permit. Like most Montana hunters, I understand the increase in costs incurred by Montana FWP and am willing to pay more to ensure the Montana hunting tradition and way of life. But an increase of 100 percent for a tag designed to cull sheep numbers is staggering. When harvesting a ewe sheep, we help FWP control herd numbers, reduce habitat damage, and improve ecosystem vitality. So why is it that a ewe sheep harvested for meat, herd control, and a healthy habitat cost the same as a trophy-of-a-lifetime ram? If this is an effort to bring in more nonresident income, it is doomed to fail because very few nonresidents apply for a ewe license. These are not deemed trophy animals, and most residents hunt them for table fare and the enjoyment of the outdoors. Like many other hunters in Montana, I will not be able to afford the ewe sheep tag and will have to do without the delectable meat I get from harvesting this beautiful animal.

MOE HERZER
Florence

EDITOR REPLIES: *The cost of a resident sheep license will go from $75 to $125 starting in 2006, an increase of 67 percent. The price hike was part of an overall increase in resident hunting and fishing license fees passed by the 2005 legislature to help FWP keep up with rising costs to manage fish and wildlife. The reader has a good point about FWP needing hunters to harvest ewes to manage sheep populations. The department will monitor hunter application rates for sheep licenses over the next several years to see if hunter numbers decline.*

■ We welcome your comments, questions, and letters to the editor. We'll edit letters as needed for accuracy, style, and length. Mail your letter to: *Montana Outdoors*, P.O. Box 200701, Helena, MT 59620-0701. Or e-mail us at: tdickson@mt.gov.

"Let's go over again these paranoid feelings you've been having that everyone is 'after' you."

The Wisdom Behind WMAs

Reports over the past year of increasing incidents of brucellosis in elk using Wyoming feed grounds have made me thankful for the foresight of Montana's early wildlife managers in establishing state wildlife management areas (WMAs).

Wyoming maintains 22 feed grounds, where wintering elk crowd together to eat food provided by the state. The main purpose of the grounds is to block the access of migrating elk to their historic winter ranges, where the wild ungulates compete with cattle for forage. The crowded conditions on feed grounds make the elk more susceptible to brucellosis and chronic wasting disease.

Montana faces a similar challenge with migrating elk, but we have chosen a different route. Beginning in the late 1930s, we began to purchase and lease prime wintering habitat where elk could feed naturally without mingling in unhealthy concentrations. It's a decision this agency has never regretted.

Since then, Montana has established 18 elk wintering areas as state WMAs. The two largest are the Sun River and Blackfoot–Clearwater wildlife management areas. Located in western Montana, these and other elk winter range WMAs support roughly 15 percent of the state's elk herd. Without them, Montanans would have fewer elk to watch and hunt, and the problem of elk depredation on private land would increase considerably.

Elk aren't the only beneficiaries of WMAs. Freezout, Ninepipe, and Pablo WMAs are wetlands managed primarily for waterfowl, shorebirds, and upland game birds. And a wide range of other wildlife use the habitats conserved in Montana's WMA system, including migrating warblers, raptors, tundra swans, wolverines, mountain goats, deer, moose, and grizzly bears.

Though the primary purpose of WMAs is to provide wildlife habitat, they are open to public hunting, wildlife watching, photography, and hiking.

WMAs also represent this agency's commitment to working with local ranching communities to reduce wildlife depredation problems. WMAs are now "part of the neighborhood," so to speak. On many, we allow carefully managed cattle grazing. That helps local ranchers, but it's also good for elk and deer, which benefit from the fresher, greener grass that grows after managed grazing. Often those ranchers incorporate a managed grazing regime on their own property adjacent to WMAs, improving wildlife habitat on the private land, too.

What's more, FWP pays "in-lieu-of-taxes" equal to what counties would receive in tax revenue if WMA lands were privately owned. And the department aggressively controls weeds to prevent their spread from WMAs to nearby agricultural lands.

Despite all the good they do, Montana's 300,000 acres of WMAs account for just one-third of one percent of Montana's land base. And part of that is leased from federal agencies, private corporations, or other state departments. (Minnesota, by comparison, is two-thirds the size of Montana yet has more than 1 million WMA acres.)

Montana has long prided itself on the wisdom of managing wildlife naturally, according to sound, biological principles. To me, that pride is justified every time I compare the sight of elk crowded into Wyoming feed grounds, eating hay or alfalfa pellets tossed from the back of a truck, to that of free-roaming elk grazing natural forage on one of Montana's scenic wildlife management areas.

—M. Jeff Hagener, *Director, Montana Fish, Wildlife & Parks*

NATURAL WONDERS

Q. *Do all female pronghorns have horns? I see some without.*

A. Roughly 70 percent of adult doe pronghorns have horns, which average about 1½ inches long. All bucks have horns, averaging 12 inches long. Both sexes shed their horn sheaths each spring.

ILLUSTRATIONS BY PETER GROSSHAUSER

Q. *It seems that I see more and more hunters afield each year. Are license sales increasing?*

A. Actually, they have remained relatively stable over the past decade. The number of Montana deer and elk licenses peaked in 1994 at 285,000. In 2004, the number was down only slightly at 270,000. The perception of increased numbers may be due to the fact that access to more and more land is being restricted. That concentrates more hunters on public land or private property such as block management areas, where landowners still allow public hunting opportunities.

Q. *How long has it been since a person could hunt grizzly bears in Montana?*

A. The last grizzly bear season was in the spring of 1991, along the Rocky Mountain Front. Hunters shot three male bears before the season was halted by a federal judge who said the state could not allow hunting a federally threatened species unless it could prove that hunting was not harming the grizzly bear population.

? Wonder about some part of Montana's natural world? E-mail us at: tdickson@mt.gov.

MICHAEL HARING

Bison hunt appears to be back on track

When Tom Blazina of Billings learned last January he was one of ten names drawn from a pool of 8,300 applicants for Montana's first bison hunt since 1991, he thought his buddies were playing a hoax.

"It would be just like them," says Blazina. "But then I looked it up on the FWP website and there it was. I couldn't believe it was true."

Turns out Blazina was right about it not being true—at least temporarily. A few days earlier, the FWP Commission had delayed the 30-day bison hunt that was about to open in Gardiner. The commissioners said they needed more time to ensure the hunts were held under "fair chase" conditions. That means the game is free ranging, the hunter has no unfair advantage over the game, and the hunt is conducted in an ethical, sportsmanlike manner. The commissioners also wanted to increase the hunting area and season length.

Now it appears Blazina may have his hunt after all. In July, the FWP Commission agreed to tentatively approve a bison hunt for the 2005–06 hunting season. The commission tentatively approved the sale of 50 either-sex licenses for use during two seasons running from November 15 through February 15, 2006. In accordance with a new state law, 16 of the licenses will be allotted to Montana's Indian tribes. And ten of the licenses will be sold to Blazina and the other hunters whose names were drawn in the January lottery. The remaining 24 licenses available to the public will be offered through a special drawing held in October.

FWP officials say the public hunt is intended to provide an opportunity for Montana hunters to harvest wild, free-roaming bison. It will also reduce damage to private property from the burgeoning bison population spilling from Yellowstone National Park by changing the animals' distribution. Public bison hunts are held in several other states, including Alaska, Arizona, South Dakota, Utah, and Wyoming.

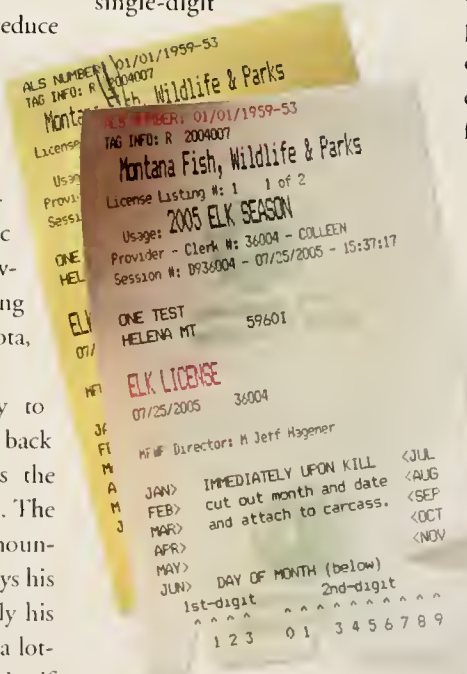
Blazina says he's happy to know that a bison hunt is back on track and that he has the good luck to take part in it. The hunter, who also drew a mountain goat permit in 2004, says his wife has urged him to apply his lucky streak to the Montana lottery: "She said it would be nice if I'd win something that makes money rather than costs money."

New procedure for validating big game tags

When is "December 2" actually "December 02"? When a hunter kills a big game animal in Montana on that date and wants to correctly validate his or her big game tag. The new tags issued by FWP for the 2005 hunting season have a slightly different look from previous years, requiring hunters to learn a new way of validating their tags.

"We made the change because hunters and license providers wanted to get rid of the plastic tag pouches, and we wanted to make the licenses waterproof and more durable," says Hank Worsech, chief of FWP's License Bureau. "Also, in the past some hunters were confused about validating the month, and this new tag makes that easier."

At the site of a killed big game animal, hunters need to cut out the month and the day, same as before. The new change is that single-digit days need to be put in a double-digit format. As an example, December "2" would be marked with a "0" then a "2."



A sample Montana elk tag correctly validated for December 2, 2005. Note the three cuts.

The double-digit requirement prevents anyone from, for example, killing an elk on the 2nd day of a month and then going out and killing a larger elk on the 12th of the month and reusing the tag on the larger animal.

"We don't anticipate the new format being a big deal once hunters get used to it, but it may cause some to pause a moment or two the first time they validate it," says Worsech. "Hunters just have to remember that they will now need to make three cuts in their tag for it to be legal."

Celebrating two decades of public stream access

During a late July visit to Montana, South Dakota trout angler Gary Pashby was fishing the Little Blackfoot River with his adult nephew when a car pulled up alongside the pair. The driver stepped out and said, "You can't fish down there past the fence. That's private land."

Pashby then listened as his nephew pointed out to the driver what every Montana stream angler knows—that the state's 1985 Stream Access Law allows public access between the high water mark on all streams and rivers, if anglers have legal access. Before leaving, the driver replied, "Well, I was sent here by the owners. You'll have to take it up with them."

Happy 20th anniversary, Montana Stream Access Law.

The law, passed by the 1985 Montana legislature, states "that

the public, without regard of the ownership of the land underlying the waters, may use rivers and streams for recreational use up to the ordinary high water mark."

According to Bob Lane, FWP chief legal counsel, most landowners seem to accept the law. "But a few don't," he says. "And they have used techniques such as preventing access at bridge crossings to make it difficult for anglers to reach public waters."

Lane says a Montana Attorney General's opinion in 2000 recognizes public access to streams from the road right-of-way at most public bridges. However, a few landowners have erected what have been dubbed "spite fences" up to the bridge abutments. The fencing makes access difficult and creates the impression of no public access at the site.

Despite the bridge access problem and occasional cases of angler harassment from landowners, Montana's nationally acclaimed Stream Access Law "appears to be solid," says Lane. He notes that in 2003, the U.S. Supreme Court refused to hear an appeal from landowners challenging the law. The decision let stand a Ninth Circuit Court decision upholding a federal district court's dismissal of a lawsuit challenging the Stream Access Law. The plaintiffs in the case had argued the law deprived them of their property rights without due process.

"The Supreme Court's decision should end any further constitutional challenges to the law," Lane says.

After 20 years, that's news surely worth celebrating.

Do the State Park TWIST

Fun things you never expected to do in Montana's state parks

Fall Fishing on the Tongue

Many Montanans seem to forget about fishing once hunting seasons start. But that's often the best time to catch fish. Crowds are down, and the fish go on a big bite to beef up for winter. At Tongue River Reservoir, located about an hour and a half southeast of Billings, you can catch smallmouth bass and crappies, plus catfish below the dam. "And sometimes there's a run on northern pike when the weather gets cold," says Tongue River Reservoir State Park manager Bob Peterson. The park is also open for fall camping, though there are no concessions (other than vault toilets) or even water, so bring everything you need. For more information, call (406) 234-0900.

KEVIN BROOKE

DENVERBRYAN.COM

Top 10 Montana Hunting Mistakes

As a public service, Choteau-area ranch owner David Letterman might consider running this top ten list on his late night TV show. Until that happens, however, we're left to run it ourselves. Here is the top ten list of infractions that FWP game wardens see most often. Paul, drumroll, please:

DAVE HAGENGRUBER/MONTANA FWP

The vast majority of hunters act responsibly and don't break laws, say FWP game wardens. Most infractions are simply due to hunters not taking the time to read their hunting regulations carefully.

1 Trespassing: Hunters must have the landowner's permission before *any type* of hunting on private land. Private land does not have to be posted for a hunter to be trespassing.

2 Shooting from a public roadway: It is illegal to shoot on, from, or across a road or right-of-way. Also known as the shoulder or borrow pit, the right-of-way generally lies between the fences on either side of the road.

3 Shooting before or after legal hours: Big game seasons run from one-half hour before sunrise to one-half hour after sunset. Use the approved sunrise–sunset tables listed in the hunting regulations, not the times given by local media.

4 Improper game tagging: *Immediately* after killing a big game animal, hunters must validate their hunting tag. The proper validation requires completely cutting out the two-digit date and the month on the hunting tag. The tag must be visibly attached to the carcass.

5 Party hunting: Hunters must use their own tags when harvesting a game animal. Transferring or loaning licenses between hunting party members is illegal.

6 Off-road driving: On all public lands, hunters must stay on established roads. On private land, you may drive only where the landowner authorizes you. Driving off-road can spread weeds and make an enemy of a landowner.

7 Failure to stop at check stations: All hunters and anglers must stop at check stations, going to or coming from the field, with or without game. Driving by a check station hampers efforts to gather data that FWP uses to manage fish and wildlife.

8 No evidence of animal's sex: When transporting a big game animal, evidence of the animal's sex must remain naturally attached to the carcass until the meat is processed (cut and wrapped).

9 Shooting from a vehicle: It's dangerous, unethical, and illegal to fire a firearm from a motorized vehicle.

10 Failure to wear hunter orange: Big game hunters must wear at least 400 square inches of hunter orange above the waist that is visible from all sides. Bird hunters are encouraged though not required to wear orange (at least an orange hat or vest) while in the field.

The Greatest Hunting Trip

Stalking Montana's amazingly abundant wildlife with Lewis and Clark

Ever?

By Ben Long
Paintings by John F. Clymer

"LEWIS AND CLARK IN THE BITTERROOTS" © JOHN F. CLYMER. COURTESY OF MRS. JOHN F. CLYMER AND THE CLYMER MUSEUM OF ART

HUNTING FOR SURVIVAL In the Bitterroot Mountains, during fall of 1805, expedition members nearly starved for lack of game. Yet just a few months earlier they had seen land "covered with herds of Buffaloe, Elk and Antelope."

Hunting one November morning, I pulled myself up a snowy, forested ridge in northwestern Montana. Having never ascended this part of the mountain, I felt the gut-level excitement of stepping into the unknown.

I also felt a gut-level hunger. I'd burned off breakfast long before reaching timberline, and my stomach growled. Fortunately, I had an energy bar in my pack. But considering that I'd seen no game all day, I knew that if I had been a true explorer, my lack of hunting success would put me in deep trouble.

An army travels on its stomach, and so does an expedition. For the Lewis and Clark Expedition, the situation was simple: Hunt or starve. Returning to camp empty-handed was rarely an option.

Though Lewis and Clark were happy to barter with Native Americans for corn and squash, they procured most of their protein by hunting. Over the course of their 28-month journey, they and their men hunted and ate bison, bears, elk, deer, pronghorns, prairie dogs, coyotes, and beavers. They ate birds, including common waterfowl, prairie and forest grouse, and shorebirds. Hunting was as essential to the journey as navigating a route and finding shelter. Without hunting, the Corps of Discovery never would have reached today's Montana, much less the Pacific Ocean.

Nevertheless, the arduous daily task of hunting was far more to the expedition than simply another chore. Meriwether Lewis, William Clark, and the other Corps of Discovery members knew that hunting could be fun and exciting, and that they had embarked on what was likely the greatest hunting trip of their lives. They also knew hunting could get them killed.

MEAT EATERS

The 30-plus young, athletic, hard-working members of the Lewis and Clark Expedition were fueled almost entirely by red meat, each consuming an estimated 8 pounds per day (provided they could get it). Wrote Clark: "It requires 4 deer, or an elk and a deer, or one buffalow to supply us for 24 hours." That meant the hunters had to continually find, stalk, kill, and butcher game animals.

A typical day might go like this: While most of the crew hauled the expedition's equipment up the Missouri River in a keelboat or the smaller pirogues, the best hunters foraged ahead, afoot, looking for game. Their goal was to shoot a fat elk or bison and afterwards hang the meat along the riverbank for the crew members downstream. Timing was important. If the meat was left untended overnight, wolves would devour it before the other members arrived.

Compared to today's high-powered scoped rifles that can accurately and quickly place three bullets in a 6-inch-diameter target at 400 yards, the firearms used by the Corps of Discovery were slow and unreliable. However, the explorers toted the finest firearms available, both rifles and smoothbore muskets (see sidebar, page 9). Each of the captains also carried a ceremonial spear called an espontoon. This 6-foot-long staff, tipped with a spear point, came in handy as a walking stick, a rifle rest, and a weapon—which Clark proved one day by running his through a wolf, downstream of today's Loma.

Expedition crew members were prohibited from shooting animals they didn't need for meat—a standing order from the captains designed to conserve ammunition, not wildlife. That must have been a difficult order to enforce, for the prairies along the Missouri and Yellowstone rivers teemed with game. The captains struggled to express their awe, knowing the skeptics back home would scoff at their reports.

"The whol face of the country was covered with herds of Buffaloe, Elk and Antelope," Lewis wrote near today's Montana–North Dakota border, "…so gentle that we pass near them while feeding, without apearing to excite any alarm among them and when we attract their attention, they frequently approach us more nearly to discover what we are."

"CAPTAIN CLARK—BUFFALOW GANGUE" © JOHN F. CLYMER. COURTESY OF MRS. JOHN F. CLYMER AND THE CLYMER MUSEUM OF ART

Though the explorers nearly starved in the Idaho mountains later and had to trade with Indians along the Columbia for dogs to eat, they feasted in 1805 along what they called "the fat plains of the Missouri." Wrote Lewis near the confluence of the Missouri and Yellowstone rivers: "We can send out at any time and obtain whatever species of meat the country affords in as large quantity as we wish."

Most astonishing were the bison that mowed the prairie grass short and filled the night with the noise of their rutting. Historians estimate North America supported 60 million bison at the time. Near the Great Falls, Lewis estimated he could see 10,000 bison from one spot, along with "their faithful shepherds," the wolves. While descending the Yellowstone the next summer, near today's Billings, Clark had to wait on the riverbank for an hour while a steady stream of bison stampeded across the river ahead of him.

Often, the expedition members hunted game they had never seen before—or even heard of. Pronghorns, bighorn sheep, coyotes, and prairie dogs were new to science. Near the mouth of the Sun River, Lewis saw a "tiger cat." He fired and missed and was left scratching his head. It was likely a wolverine—a creature utterly foreign to the captain's home state of Virginia.

The Corps's hunters wounded a moose near today's Lincoln, but never killed one. They saw mountain goats in the Lemhi Range, but never close enough to kill. Bighorn sheep, however, were more accessible. At the time, the animals lived as far east as today's western North Dakota badlands, and the expedition members killed nearly three dozen of the muscular animals for food.

The crew hunted many familiar animals, as well. At the time, both bison and elk were common on both sides of the Mississippi. Bison were popular targets with the crew, who particularly enjoyed eating the animal's tongue. They consumed the entire beast, however, including boiled guts (which they called "pudding") and bone marrow.

Elk were a top prize, not only for the meat but also the hides, which were flexible enough to be made into clothing and rope. However, crew members ate so many elk, particularly lean animals in late winter, that some thoroughly tired of it.

THE GREAT BEAR

Though meat was essential, that wasn't the only reason crew members went hunting. The captains were under instructions to collect animal specimens. So they shot animals such as badgers, plovers, and coyotes and sent the dried bones, feathers, and pelts back to their insatiably curious boss, President Thomas Jefferson.

Of all these new "discoveries" (Indians of course had known of these animals for centuries), none were more exciting than the grizzly. Before even seeing the great bear, Lewis and Clark knew its fearsome reputation. Through the winter of 1804–05 in the Mandan villages of today's North Dakota, Indians wearing necklaces of 3-inch-long bear claws showed the explorers their scars and told frightening tales of battling with grizzlies.

Feeding the Corps

The intense labor required of the Corps of Discovery crew members required a constant supply of meat. According to *The Natural History of the Lewis and Clark Expedition*, edited by Raymond Burroughs, the expedition's hunters killed the following during the journey:

Deer (whitetail, mule, blacktail)	1,001
Elk	375
Bison	227
Pronghorn	62
Bighorn sheep	35
Grizzly bear	43
Black bear	23
Beaver	113
Various geese	104
Various ducks	45
Various grouse	46
Wild turkey	9

Freelance writer Ben Long lives in Kalispell. The work of John F. Clymer (1907–1989), a highly sought illustrator of the American West, was featured on the covers of numerous publications including The Saturday Evening Post, Field & Stream, *and* Sports Afield.

Firearms of Lewis and Clark

by Tom Dickson

If required to use the firearms of Lewis and Clark, most modern Montana hunters would have a hard time filling their doe tag, much less stopping a charging grizzly bear.

How did the hunting firearms of 200 years ago compare with the modern scoped rifles used today? Gene Hickman, an expert on early American weapons who lives in Helena, says expedition members used two main types of guns for hunting: muskets (smoothbores) and rifles. The longer muskets—with a barrel similar to a 14-gauge shotgun only much longer—included the fusil (or "fuzee"), a British-made firearm favored by trappers and Indians, and the Model 1795 Springfield. The .69-caliber muskets fired a round ball the size of a marble through a smooth barrel up to 48 inches long (a modern rifle's barrel is roughly 24 to 28 inches long). The longer barrel was thought to increase accuracy and burn powder more completely, Hickman says. With these guns, an experienced shooter could reliably hit a pie plate—a general measure of a big game animal's kill area—at 50 to 75 yards, and sometimes farther.

Historians disagree over exactly what type of rifle (a gun with a grooved spiral inside the barrel) the expedition members carried. The expedition members called them "short rifles" because the barrels were only 33 inches long. These .50- or .54-caliber (meaning the bullets were .50 or .54 inches wide) firearms sent a bullet spinning from the muzzle (like a football thrown in a spiral) much straighter than the smoothbores. Hickman says an experienced shooter could easily hit a pie plate at 100 yards and sometimes even 150 yards with these guns.

The rifles were lighter and more accurate than the muskets but took longer to reload. The barrel grooves (rifling) slowed the ramrod used to pack powder and the lead bullet. Hickman says an experienced soldier or hunter could load and fire a smoothbore musket in roughly 45 seconds, while it took about twice that for a rifle.

Both types of guns had iron sights (the musket a front sight only) and used a piece of flint in the hammer to ignite a small amount of powder (held in a pan near the hammer). This in turn ignited the main powder charge in the gun's firing chamber (breech). "There was a lot that could go wrong," says Hickman. "Powder got wet, the flash holes got plugged, flint wore out, and the barrels often were clogged with residue."

Keeping the guns in working order was a constant chore for John Shields, the expedition's "artificer" (a combination gunsmith and blacksmith).

Crew members killed geese and ducks with the smoothbore muskets, loaded with "swan shot" (made by dripping molten lead from several feet high into a bucket of water).

SPRINGFIELD ARMORY NATL. HISTORIC SITE

THE RIGHT ARMS FOR BEAR? The Model 1795 Springfield, used by expedition members for hunting grizzlies and other big game.

Considering that grizzlies are one of the most formidable North American animals, many modern hunters may wonder how expedition members were able to fend off the big bears, killing 43. As noted western conservation writer Paul Schullery writes in *Lewis and Clark Among the Grizzlies*: "It amazes me that no one got killed, or even seriously injured."

Hickman, an experienced big game hunter who has used replica early 19th-century firearms to kill both deer and bison, agrees.

"It's remarkable what the expedition could do with the firearms they had," he says. "They were good hunters, and they likely didn't take too many risks, especially with grizzlies. I think they really knew what they were doing."

HUNTING FIREARMS: *Now and Then*

	TODAY	LEWIS & CLARK ERA
Range and accuracy	With scopes, accurate to 400 yards or more.	Muskets accurate to 50–75 yards, rifles to 100–150 yards.
Barrel length	24–28 inches.	Muskets: 36–48 inches. Rifles: 33 inches.
Firepower	Depends on the caliber.	Both guns used to kill bison, elk, grizzlies, and other big game.
Speed of loading	Semi-automatics can issue 5 shots in 3 seconds.	Load and fire 1 shot every 45–90 seconds.
Weight	Average 7–9 lbs. with scope.	Average 8–10 lbs. with bayonet.
Reliability	Machined steel, engineered parts, rarely break down. But repairs usually can't be done in the field.	Hand-ground steel parts. Guns commonly misfired or clogged. But parts were interchangeable and could be fixed in the field.

Reckless Shot

Perhaps the most notorious of the Corps's hunting episodes occurred just outside of present-day Montana. In August 1806, near the confluence of the Missouri and Yellowstone rivers, Pierre Cruzatte fired at the elkskin-clad Lewis, whom he mistook for an elk, and struck the captain in the upper left thigh. Cruzatte, nearly blind, blamed Indians. But Lewis had the evidence in his britches—a .54-caliber rifle ball that Indians unlikely would have carried—and the wild-firing Frenchman eventually confessed.

"HASTY RETREAT" © JOHN F. CLYMER. COURTESY OF MRS. JOHN F. CLYMER AND THE CLYMER MUSEUM OF ART

In the Dakotas, the explorers saw grizzly tracks "3 times as large as a mans track," wrote Clark. Though expedition members had regularly encountered—and killed—black bears, this was the first sign of the grizzly. Then, near today's Wolf Point, Montana, they encountered the great bear itself. On October 20, 1805, the partially blind Pierre Cruzatte shot at what the Indians called the "white bear"—named for the grizzly's often light brown coat—before the wounded animal chased him off.

Grizzlies proved more awesome than expedition members could have imagined. The first one they actually were able to kill absorbed ten large bullets, several fired through the animal's lungs. Time after time, irate, wounded grizzlies turned on their attackers, chasing the men into the river. Lewis called them "a furious and formidable anamal…it is astonishing to see the wounds they will bear before they can be put to death."

The grizzly bears usually weren't killed in self-defense. The explorers went after them for specimens and for useful products such as pelts and bear fat, which they used for cooking oil.

The men took to hunting the bears in squadrons. Several crew members would stalk a bear together. Half would take aim and shoot, while the others held fire. A second volley followed, while the first gunners reloaded. They found that only a lucky shot to the brain could reliably kill a grizzly.

Though they'd been eager to test their weapons and skills against the legendary bear, the explorers became increasingly less keen after just a few encounters with the real thing. Wrote Lewis: "I find the curiosity of our party is pretty well satisfyed with rispect to this anamal."

RARE AND PRECIOUS

Back in the modern mountains of northwestern Montana, I fought the snow until I broke timberline. Looking west into the Cabinet Mountain Wilderness, I saw a scene unchanged from Lewis and Clark's time and before. A small band of elk—my main quarry—crossed a saddle a half mile away. By the end of the day, I would encounter moose, as well as white-tailed and mule deer. Above me, I glassed the alpine haunts of mountain goats and bighorn sheep. Grizzly bears and wolves were somewhere out there, too.

As I have many times, I thought then how rare and precious it is that hunters can still encounter all the game animals that Lewis and Clark's crew hunted 200 years ago and American Indians hunted for centuries before that. Of all the states on the Lewis and Clark Trail, only Montana can make such a claim.

Our state's wealth of wildlife is no accident, but the result of a hard-fought conservation movement. In the first century after Lewis and Clark's journey, America hosted a great orgy of killing, difficult today to fathom. Within a few years after the railroads came, the millions of bison on the northern plains were reduced to a few hundred. Elk, pronghorns, bighorn sheep, and beavers were shot and trapped to just fractions of their former populations. Thrill-seekers and market hunters left the once-teeming prairies a silent wasteland of bones. Less than a century after Lewis and Clark witnessed great seas of bison, scientists from the Smithsonian Institution searched for just one specimen. After three weeks of trying, they were unable to find a single bison.

But beginning in the early 1900s, hunter-conservationists reversed the course of wildlife population declines. They ended the slaughter, regulated harvest, and demanded that federal and state agencies conserve species using the sound biological principles of wildlife management.

We will never again see the five Great Falls run free. And much of the wilderness witnessed by Lewis and Clark is today either gone or diminished. But Montana's wild heritage lives on. By promoting and supporting science-based conservation, those who value the state's wildness can ensure it remains for another two centuries and beyond.

Unlike the Corps of Discovery members, I was fortunate to have a kitchen and stocked cupboards waiting at the end of my day. But like those explorers and fellow hunters, I was also fortunate to have the chance to hunt for game more diverse and abundant than almost anywhere else in the modern world.

Proof They're Bear Proof

By Kerry Brophy

Can a garbage container save a bear's life? Bear experts in Montana are hoping a new program that tests bear-resistant products will reduce conflicts between bears and humans that too often result in dead bears.

As people build homes and cabins farther and farther into the countryside—what resource managers call the "urban-wildlife interface"—many unknowingly attract hungry black and grizzly bears. The animals find easy pickings in garbage cans, dumpsters, compost piles, pet food dishes, and even bird feeders.

It's dangerous for bears to hang around places where people live—dangerous for people and bears. In some cases, Montana Fish, Wildlife & Parks personnel scare away garbage-grubbing bears. But in other situations, where bears grow addicted to garbage, state officials may have to give landowners citations and even kill bears that are repeat offenders.

To help prevent the problems from occurring, wildlife officials look for ways to keep bears from getting hooked on human and pet food. Recently, the Interagency Grizzly Bear Committee (IGBC), Montana FWP, the Living With Wildlife Foundation, and the Grizzly and Wolf Discovery Center jointly conducted a study to determine which of the many available products are truly bear proof.

Patricia Sowka, executive director of the foundation, conducted tests in 2004 at the Grizzly and Wolf Discovery Center in West Yellowstone in conjunction with the center's staff. Many of the center's grizzly bears were captured after repeatedly breaking into human food and garbage containers.

"These bears were perfect for the tests because they'd already learned to access various types of containers," Sowka says.

The hungry, determined bears tried to pry food from 30 different containers. To pass the test, a food locker or garbage bin had to keep animals from reaching the food inside for at least 90 minutes.

According to Sowka, one goal of the testing program is to keep ineffective products off the market. "Putting out bear-resistant containers that don't work is a bad deal all around," she says. "Bears get in trouble, people get mad, and everybody loses."

Jamie Jonkel, one of FWP's five bear management specialists, says he has been receiving a growing number of requests to handle delinquent bears lured to homes, ranches, and cabins. He says many home owners don't know how to store their food and garbage properly.

"There's a big learning curve here in western Montana," says Jonkel, who works out of Missoula. "Most native Montanans are used to running a tight ship when it comes to keeping food away from wildlife, but many of the people moving here aren't. They come to Montana out of a love of wildlife, but some don't have a clue how to live with wildlife."

Jonkel, who worked on the study with Sowka, says bear-resistant containers provide one solution to the growing conflicts. "It's been shown again and again that bears can live with people," Jonkel says. "The way to solve the problem is really pretty simple—make it impossible for bears to get to food or garbage."

Companies in Canada and Alaska are also developing bear-resistant products and techniques. One Alberta company's garbage bins, certified by the recent IGBC-sponsored study, are a residential version of the larger, metal bins used in the province's national parks. In Alaska, where small communities of people live within vast tracts of wildlife habitat, one approach is to use community transfer stations. People take garbage to the stations, where it is stored in large bear-proof containers that are surrounded by a tall, bear-proof fence.

Sowka, whose foundation works to identify and reduce conflicts between people and wildlife, understands that some people don't like bears. They would prefer to have FWP simply remove the animals instead of dealing with the food and garbage problem themselves. "But they make a choice when they move to bear country," she says. "This is the bears' environment, and people are sharing it with them. When there's an easy solution, like storing food and garbage in bear-proof containers, I want people to know about it."

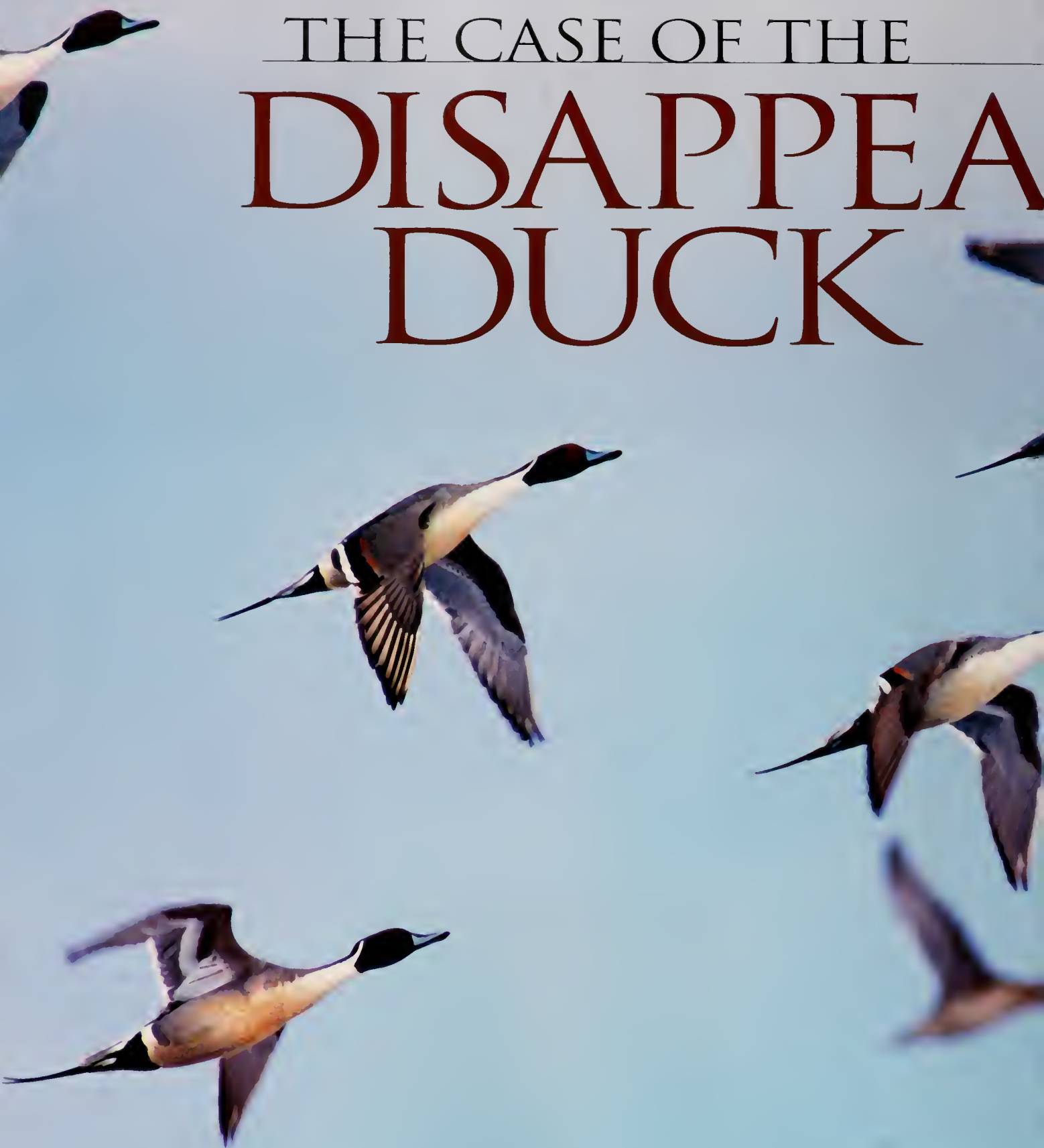
PHOTO COURTESY OF LIVING WITH WILDLIFE FOUNDATION

EXPERT TESTERS Researchers used bears experienced in robbing garbage and food bins to learn which products could truly foil the bruins' efforts.

For results of the study and a list of certified bear-proof containers, go to lwwf.org and look for the Bear-Resistant Products Testing Program under "Projects." Also, the IGBC website (fs.fed.us/r1/wildlife/igbc/ then "Bear Safety") contains a list of additional certified food containers based on tests done in 1989. The Missoula-based Predator Solutions, Inc. (406-249-7241 or predatorsolutions.com) works with the Living with Wildlife Foundation to purchase the most effective bear-proof containers in bulk to sell for a reduced rate.

Kerry Brophy is a freelance writer in Lander, Wyoming.

THE CASE OF THE DISAPPEA DUCK



PINTAILS IN FLIGHT BY NEAL AND MARY JANE MISHLER

RING

WHY HAVE PINTAIL NUMBERS BEEN DROPPING OVER THE PAST FEW DECADES, WHILE OTHER SIMILAR WATERFOWL SPECIES HAVE SHOWN REMARKABLE RECOVERIES?

BY DAVE CARTY

Pintail hen PTT 39534 left California's Central Valley on March 15, 2003.

Three days later, she stopped in northern California and then, by the beginning of the following week, flew to southern Oregon. After another layover in southeastern Oregon, she winged almost nonstop over Idaho and Montana. Satellite signals finally fixed her location in southern Saskatchewan, just north of the Montana border.

On May 3, apparently unable to shake her itch to travel, the tan-colored duck headed south to the Missouri River in western North Dakota. She evidently liked the spot, for she stayed there ten days before flying over Montana once again, en route to the northern Rocky Mountain Front. By the first week of June, the pintail returned to southern Saskatchewan, hobnobbing with tens of thousands of other pintails that recently arrived from wintering grounds in Texas, New Mexico, and California. And then, in what is perhaps symbolic of the plight of the species, PTT 39534 vanished. The duck's signal died on July 21, 2003, at Montana's Lake Francis.

That particular bird was among several dozen pintails fitted with tiny transmitters in 2003, the fourth year of a project aimed at determining pintail migration routes. The study, named Discovery for Recovery, was conducted jointly by Ducks Unlimited, the U.S. Geological Service (USGS), and the private Tuscany Research Institute. A single member of the institute personally donated $1 million to launch the project.

It is a rare individual who makes that kind of financial commitment to a bird, but pintails (also called sprigs) have long engendered a special reverence from waterfowlers and bird watchers. And the pintail's puzzling decline, with populations dropping while other puddle duck numbers have climbed, is intriguing enough to inspire exceptional contributions to find a solution.

GARY KRAMER NET

MONTANA OUTDOORS

PLAYA LAKES JOINT VENTURE

PROBLEMS ON THE PLAYAS Like southern versions of northern prairie potholes, playa lakes (far right) are shallow wetlands filled with a rich stew of invertebrates that ducks need to build fat and protein. A major wintering area for pintails from across North America, the Playa Lakes Region has been degraded by siltation and dehydrated by water withdrawals.

The pintail drake is considered the most graceful and elegant of the ducks. From the tip of his gray beak to the end of his pointed tail, he is as long as a mallard but noticeably slimmer—a thoroughbred to the mallard's draft horse. Hens are less handsomely colored but otherwise sport the same elegant visage.

Lately, however, their good looks have not been doing pintails much good. Continental populations have steadily declined over the past 50 years. Surveys showed a sharp drop from a high of 10 million pintails in 1955 to fewer than half that just one decade later. Since then, pintail numbers have been up and down, but mostly down. The 2001 estimated population was around 3 million, well below the goal of 5.6 million birds set in 1986 by the North American Waterfowl Management Plan. (State and federal duck managers established the plan to restore continental waterfowl numbers.) Meanwhile, since the late 1980s, populations of most other waterfowl species have either been rising or holding steady.

THE PLAYA LAKES PUZZLE

For the past decade, waterfowl biologists from California to Montana have studied aerial surveys, analyzed data, and monitored habitat trying to learn why pintail populations won't recover like other duck populations have. One key factor seems to be habitat conditions of pintail wintering grounds—California's Central Valley and, especially, the Playa Lakes Region of the Texas panhandle and parts of New Mexico, Kansas, Colorado, and Oklahoma. (Pintails that breed in Montana may spend winters in any of these states.)

"There's no place else with as many playas as what we have down here," says David Haukos, a U.S. Fish and Wildlife Service migratory bird biologist at Texas Tech. The small (less than 30 acres) and shallow wetlands, he says, are "a center of plant and animal biodiversity—life kind of revolves around them."

Unfortunately, these biological centerpieces—sort of the southern high plains' equivalent of the northern plains' prairie potholes—are in trouble. Sedimentation is the main problem. Cultivation of land surrounding the wetlands sends silt into the basins, reducing the time they hold water and causing playa lakes to produce less natural vegetation.

"We winter pintails from all over North America," Haukos says. "If conditions deteriorate in the playas, that can have continental impacts." The biologist explains that if ducks can't build up enough fat and protein in winter, they are less able to survive the rigors of spring migration. Even if they survive, "they won't nest if their body weight is not sufficient," Haukos says.

While Texas biologists understand the importance of protecting these vital habitats, there's another puzzle affecting pintails that nobody can explain: Increasingly, migrant pintails from the north arrive in Texas each fall in poorer shape than pintails did 20 years ago. Evidently, between their breeding grounds in prairie Canada and their wintering grounds in Texas, something is hurting pintails. But what?

"To be honest with you," says Haukos. "I really don't know."

DISCOVERY FOR RECOVERY LAUNCHED

He's not the only one. In 2000, a team of federal and state biologists launched a project to learn what factors limit pintail recovery. For the next four years, the Discovery for Recovery project tracked pintails to learn where they go after leaving wintering grounds in California, New Mexico, and Texas. It turns out the birds end up practically everywhere.

After netting pintails from California's Central Valley and fitting them with tiny backpack transmitters, USGS research biologist Mike Miller parked himself at a computer terminal and began monitoring the birds. Some wound up in Oregon, the Dakotas, Montana, Canada, Alaska, and even Russia. And they made their trips incredibly fast. One rocketed from northern California to the southern coast of Alaska—an 1,800-mile trip over the ocean—in less than 30 hours. "Pintails," Miller says, "are flying machines."

The research scientist says the study revealed other important facets of pintail behavior, especially their habitat use. For instance, pintails avoid large lakes and wetlands in state and national waterfowl refuges and favor small, shallow, temporary wetlands. Many of these "ephemeral" or "seasonal" wetlands, as biologists call them, are wet dimples on private farm and ranch lands.

"Pintails like to associate with cattle pastures in the spring, when the snow melts and the rivers come up and create shallow flooding," Miller says. "You also have cow pies from the previous year adding nutrients to the wet environment."

Freelance writer Dave Carty lives in Bozeman.

Researchers also found that pintails like shallow wetlands in wide open areas, where they can see long distances.

Pintails seem to be extremely particular about where they breed. If they don't find shallow wetlands and flooded pastures when they head north in spring—due to drought or other factors—they keep flying. Eventually the birds may find what they need in northern Canada or Alaska, but by then they may be too exhausted to breed for that year.

The pintail's specialized breeding requirements may partially account for why the birds have done poorly in recent years while populations of many similar duck species have increased. Like mallards, gadwalls, wigeon, and several other species, pintails are in the category of dabbling, or puddle ducks. They feed mainly in wetlands, tipping down (dabbling) to feed on underwater vegetation or aquatic insects just below the water surface.

Since the late 1980s, numbers of other puddle ducks have rebounded after dropping in the early 1980s. That's been due to ample precipitation in the Prairie Pothole Region, where most of these ducks breed, and to the Conservation Reserve Program (CRP), a federal program in the United States that pays farmers to retire unproductive land and plant it in grasses (which ducks use for nesting).

During the 1990s, pintail numbers rose slightly in response to rains that filled dry wetlands, but not as much as other dabblers, particularly mallards. "One reason is that pintails don't use the dense CRP cover as much as other ducks do," says Jeff

RODNEY SCHLECHT

EARTHNAMES.NET

STUBBLE TROUBLE When shortgrass prairies in southern Canada were converted to wheat, pintails nested in the spring stubble (left), only to have their nests plowed under. Recent plantings of winter wheat allow the ducks to bring off broods before the tractors arrive.

Herbert, assistant FWP Wildlife Division chief. "They prefer shortgrass cover."

Herbert and other northern waterfowl experts also say the recent drought and declining habitat in prairie Canada likely contribute to the pintail population's struggle to recover. And when biologists talk "habitat" in that critical part of the pintail's range, they often mean "agriculture."

A BETTER WHEAT FOR PINTAILS

Historically, pintails have nested in short prairie grass near seasonal wetlands. These days, however, much shortgrass prairie in southern Canada provinces has been plowed up and converted to wheat fields. After harvesting wheat in late summer, Canadian farmers often leave the foot-high stubble over the winter. The stubble looks enough like short prairie grass to attract nesting pairs of pintails the following April. But when the spring planting season rolls around the following month, the farmers plow up the stubble—and any nests in it.

Increasingly, however, Canadian farmers are planting what is called winter wheat in the fall after their regular wheat harvest. Winter wheat sprouts the next spring, providing nesting cover for pintails. And it is not harvested until summer, well after most pintails have hatched and left the nest.

This agricultural conversion has not gone unnoticed by Ducks Unlimited Canada. "We are taking a multifaceted approach to encourage the adoption of winter wheat," says the organization's conservation planning biologist, Karla Guyn. "The first thing we did was establish an eco-agriculture chair at the University of Saskatchewan, which is held by a winter wheat breeder." That breeder, adds Guyn, developed new varieties of winter wheat that work well on southern Canada farms.

Wide-scale adoption of winter wheat will take time. That variety of the grain is not nearly as common in Saskatchewan and Alberta as it is in Montana and North Dakota. Encouraging Canadian farmers to change lifelong habits means getting them to embrace a cultural shift. With that in mind, Ducks Unlimited Canada launched a program that pays nominal sums to influential farmers in important waterfowl areas to grow winter wheat and then spread the word.

"So far," says Guyn, "the response has been good."

MONTANA'S PINTAILS

Meanwhile in Montana, North Dakota, and other United States breeding areas, state waterfowl biologists are praying for rain. And, at least in spring and early summer of 2005, they got it.

"Pintail numbers here have been down during the drought years," says Jim Hansen, FWP's Central Flyway coordinator. "But we figure that's a temporary situation. When the water comes back, the pintails will be back more where they're supposed to be." Although Montana's pintail population (as well as those in Alaska and northern Canada) has been holding steady over the past decade, the state is embracing what biologists call a "landscape-level" approach to conserving pintails.

"The concept makes sense," says Hansen. "Instead of looking at an individual pond here or there, we will look at an entire ranch or an entire portion of a county and try to figure out what we can do to help pintails and landowners—grazing systems, conservation easements, wetland preservation, that type of thing. We're looking at the big picture rather than just focusing on one small project at a time."

Such an approach does make sense. Pintails are truly a continental duck, covering much of western North America from the Gulf Coast to the Bering Sea. They use habitats as diverse as soggy southern rice plantations and dry northern wheat fields. Waterfowl managers understand that if they hope to identify and then address the reasons for the bird's frustratingly persistent population decline, they'll need to examine every aspect of the pintail's various habitats and behaviors. Biologists, hunters, and other conservationists hope that enough research will help them solve the case of the disappearing duck and find ways to restore populations of this graceful, elegant bird across western North America.

Well Worth the Wait

Seelye's 2004 Missouri Breaks ram is likely the world's second largest ever shot with a bow.

By MARK HENCKEL

This time of year, our hunting dreams float through the high country and stalk the open prairies. Our dreams are out there, just waiting for us to make them come true.

With many 2005 hunting seasons already under way, it's time for us to remember our most exhilarating hunting dreams. It's exciting to feel them pulse through our veins when we pick up a rifle, shotgun, or bow. And it's good to know that with time, skill, and just a bit of luck, our dreams really can come true.

In that way, Rob Seelye is just like the rest of us. The only difference is that the Laurel bowhunter realized perhaps his fondest dream last year in the form of a massive bighorn sheep. Think of his amazing story as inspiration to carry you through this year's seasons—and perhaps help fulfill dreams of your own.

Like so many other would-be sheep hunters, Seelye faithfully applied for a bighorn license each year. Like so many others, he got a refund in the mail rather than a license—in his case, for 25 long years.

But in 2004, Seelye finally drew a sheep license for Missouri Breaks Hunting District 482, the south side of the Missouri River west of the Fred Robinson Bridge.

"I decided I was going to put everything I had into this once-in-a-lifetime hunt," Seelye says. "I was going to hunt with my bow, and I was going to go all out and try to get a really good ram."

The decision to bowhunt for the bighorn was easy. Seelye hadn't hunted with a rifle in over two decades. And he'd been successful with a bow, killing 20 bull elk.

"I spent every weekend in August and early September up there looking for sheep, from the river and from land," he says. "I got to know the landscape and started looking at sheep." When sheep season opened September 15, Seelye began hunting every weekend and on every available weekday he could spare from work.

"When I was hunting them in late September and October, the little rams were easy to get close to. The bigger rams, though, were real tough," Seelye says.

DAN MOORE

NEAR-RECORD RAM Laurel bowhunter Rob Seelye last October with his massive Missouri Breaks bighorn, which scored 199 points, short of the world archery record by less than 1 point.

As the bighorn breeding season drew closer, the bigger rams grew less wary.

"On the last weekend of October, I got up close to rams that were in the 150 to 160 class," he recalls, referring to the horn size using a scoring system recognized by international hunting organizations. "By that time, I'd gotten close to 20 to 25 rams." Although Seelye knew many were trophy animals, none was the truly big one he was looking for.

Finally, on November 2, with his friend Dan Moore of Kalispell due in camp, Seelye spent yet another evening with binoculars and spotting scope, searching for sheep. This time, he spotted several with massive curls close to the world bowhunting record of nearly 200 points.

"Three rams were traveling together, and they were all big. I figured two would score 180 or 190, and the other even more," he says. "But there wasn't time in the evening to go after them."

The following morning, Seelye and his friend Moore went looking for the big rams and spotted them again.

Twice Seelye stalked close, to within 25 and then 20 yards, but each time the sheep moved off before he could get off a clean shot. On his third stalk, he got to within bow range of the biggest ram. Seelye had a clear shot and let loose with an arrow from his compound bow. It was a good hit. The ram ran about 30 yards, fell, then rolled a short ways down a hill.

Official scorers later measured the length of the big ram's two horns at 40⅝ and 41⅛ inches. The circumference of each of the bases was 17⅞ inches. By counting the horns' growth rings, biologists estimated that the sheep was seven and a half years old.

After the mandatory 60-day drying period (to allow for shrinkage), Seelye's bighorn ram scored 199 points, just shy of the 199⅞-point Canadian sheep that tops the record list for the Pope & Young Club, an organization that maintains archery big game records worldwide. When Pope & Young Club scoring officials meet next year to make their final judgment, they will likely certify Seelye's Montana ram as second in the world.

Seelye's bighorn will easily top the Montana archery state record of 192⅛ points, but it's a tad shy of the state firearms bighorn sheep record of 204⅞ points.

Seelye knows he likely will never have another chance to top his extraordinary hunting achievement. "I'm 51 now, and my chances of drawing another sheep tag are pretty slim," he says. "This was pretty much a once-in-a-lifetime deal, and I knew it."

Mark Henckel is the outdoors editor of the Billings Gazette.

The [Right] Rain

Sage grouse chick production was terrible in north-central Montana's Phillips County that spring. It was 2001, the first year of University of Montana doctoral candidate Brendan Moynahan's three-year study on how habitat conditions affect sage grouse populations, especially during the nesting and brood-rearing season. Largely due to drought, sage grouse recruitment (the number of young that survive to adulthood each year) was extremely low that year. However, a few months later, several upland bird hunters told the research scientist they'd seen more sage grouse in his study area than they'd seen in ten years.

Why were hunters seeing abundant grouse when Moynahan had just documented low production? And how are the timing and amount of precipitation, habitat conditions, and wildlife populations related?

The answers reveal much about the complex ways sage grouse and other wildlife respond to moisture. And how, to the average hunter or other wildlife watcher, precipitation amounts that appear to be beneficial—or harmful—to birds and other wild animals may in fact have the opposite effect. What Moynahan learned during his study reaffirms what other wildlife biologists have noticed over time: It is primarily the timing and type of precipitation that falls during the year—not necessarily the total annual amount—that affects the size of wildlife populations and influences public perceptions of how those populations are faring.

Why the timing of precipitation may mean far more to wildlife populations (and hunters' perceptions) than total inches

by Sam Curtis

A Three-Year Eye Opener

At the start of the sage grouse study, several previous years of drought had robbed the birds of crucial habitat needed to nest successfully. The lack of moisture meant there was little residual (brown) grass cover from the previous year and even less new (green) grass cover in spring of 2001. Nests, usually under sagebrush plants, were poorly hidden and much more exposed to coyotes, raptors, and other predators.

Things were even worse for the few chicks that hatched. "The forbs and insects that chicks eat before switching to sagebrush in the fall were almost entirely lacking because of the dry spring," says Moynahan, who now works for an environmental consulting firm in Helena.

Big Hole Valley near Dillon by Jeff Erickson

Of the 85 hens Moynahan radio-marked that year, only 35 built nests that hatched young. From those nests, only a single chick survived predation, starvation, or dehydration.

The next year, moderate amounts of rain fell evenly across the study area during the nesting and brood-rearing months of May through July. "We saw nearly double the nest success of 2001," says Moynahan. "Nearly all the hens that failed in their first nesting attempt tried to nest again, and chick survival was much improved over 2001."

Nesting conditions were even better in 2003. That spring, sage grouse nests were better protected by residual grass cover from the year before. Mild temperatures and abundant rainfall caused sweet clover to grow waist high. In addition, insects were plentiful. That yeat, says Moynahan, "brood survival went through the roof."

What's perhaps most interesting is that the entire study period of 2001–03 was considered part of the region's sustained drought, yet over plenty of suitable habitat," explains Moynahan. "That made them difficult for hunters to find."

Good Weather for Ducks

The timing of precipitation also affects other species. Certain ducks, for example, have their best nesting success after ample fall rains and winter snows produce temporary "seasonal" wetlands used for nesting the following spring.

"When the top 4 or 5 inches of soil has adequate moisture in the fall, it freezes and forms what's called a frost seal," explains Jeff Herbert, assistant chief of FWP's Wildlife Division. "Then when snow starts to melt in the spring, it can't soak into the ground because of the frost seal. Instead, the snowmelt runs off into potholes and small reservoirs, forming temporary shallow wetlands on the prairies of eastern Montana."

BRENDAN J. MOYNAHAN

DRY VS. WET SPRING Sage grouse chicks suffered terribly from lack of cover in 2001 (left) but thrived two years later (right and far right) after abundant spring rains produced lush sweet clover and other vegetation.

BRENDAN J. MOYNAHAN

GARY L. HART

recruitment varied widely during the three study years. What mattered most to grouse was the timing and amount of precipitation in May, June, and July. In two of the study's three years, enough rain fell during that period to foster good to excellent grouse production.

The study also demonstrated that not all precipitation is beneficial to sage grouse. In late December 2003, a storm swept across the study area, dumping 2 to 3 feet of snow and covering much of the sagebrush that grouse depend on for food and cover. The following two weeks, cold and calm, lacked the wind that typically clears snow off sagebrush and blows it into coulees. As a result, many grouse starved. At the end of the two weeks, 30 percent of 248 radio-marked hens were dead.

"It had never been documented before that winter weather could affect sage grouse this profoundly," Moynahan says.

The study also showed how precipitation can distort hunters' perceptions of what's happening to wildlife. During the dry year of 2001, when almost no young grouse survived, adult birds concentrated in isolated pockets of high-quality habitat during fall.

"Hunters who found those habitat pockets saw a lot of birds, even though the population was down," Moynahan says.

On the other hand, hunters reported seeing very few sage grouse in 2002 and 2003, even though grouse production had increased significantly. "During those falls, the birds were widely dispersed

According to Jim Hansen, FWP's Central Flyway coordinator in Billings, these temporary wetlands supply two important ingredients for nest success. "First, they give ducks more private places for spring nesting," he says. "Ducks are territorial during breeding season, and nesting pairs need nesting space that's all their own."

Also, these seasonal wetlands have grassy bottoms where many invertebrates live. "Because they are shallow, the temporary wetlands are the first to warm up in spring," Hansen says. "They turn into a bug soup that provides the high-protein diet that early nesting ducks, such as pintails and mallards, need to fuel egg growth."

But that's only if things work out just right. If any part of the perfect precipitation equation is off, nesting success suffers. For example, after the snowy winter of 2003–04, biologists thought spring snowmelt would create great conditions for breeding mallards and pintails in northeastern Montana. But it turns out there wasn't a good frost seal in the fall of 2003.

"So in the spring of 2004, the ground sucked up all the moisture and the shallow wetlands never amounted to much," Herbert says.

As was the case with sage grouse in the Phillips County study, precipitation conditions that affect duck production also influence hunter perception of duck numbers. "Sometimes, when water is low and there are fewer bodies of water, hunters may see a pile of ducks in certain areas because the birds are forced to concentrate," Hansen says. "Hunters may think there are birds all over the place, when in fact the opposite is true. Then, in real wet years, it may seem that

Freelance writer Sam Curtis lives near Bozeman.

duck numbers are down. Hunters' favorite spots may not have a whole lot of ducks because the birds have room to spread out."

That difference between reality and perception can also apply to news reports that focus on only one aspect of precipitation and the landscape. Thomas Baumeister, chief of FWP's Education Bureau, says he read several news reports the past spring with headlines predicting that abundant May and June rains would create a huge vegetation buildup. When the abundant growth dried in August, the reports stressed, it could create a potential tinderbox for wildfires.

"That was really only the fire specialist's perspective," Baumeister says. "The headlines struck me as alarmist, saying how 'bad' those early rains could be. But there's always another side to the precipitation story. Those rains also created the abundant succulent vegetation essential for many wildlife species. So what may be bad for fires may be good for wildlife, and vice versa."

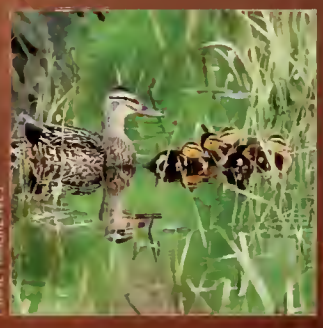
"When the ground is parched, it takes a certain amount of moisture to fill the spaces between the little soil particles so roots can start pulling moisture out of the soil," he says. "If it has been really dry for two years, and all of a sudden we get 18 inches of moisture, plants may not get 18 inches of positive benefit because the soil absorbs 10 inches of moisture before it gets to the plants' root systems."

Just as there are lag times in the positive effects of moisture, there may be delays in the negative effects of drought.

"Mule deer does may be able to raise fawns for several years as conditions worsen," says Hamlin. "But drought slowly drains their reserves until they can't produce fawns that survive. When drought gets severe enough, even does may die during a severe or even average winter."

Researchers also found that snow depth greatly influences mule

DIANE HARGREAVES


DIANE HARGREAVES

WHIMSICAL WEATHER
Rain can drench one county but miss another entirely. That can produce superb habitat for waterfowl and deer in parts of Montana, while habitat remains sparse just a few miles away.

JEAN VOGEL

It's All Connected

The more biologists study wildlife, the more they learn how rain and snow affect populations. For the past 40 years, FWP research biologists have studied mule deer in the Missouri River Breaks. There, they have learned how precipitation patterns can set off an ecological chain of events that works for or against healthy wildlife populations.

For example, mule deer does can't produce enough milk to raise healthy fawns without the energy, protein, and moisture provided by succulent forbs (flowering plants) and other forage. Abundant and persistent forage growth requires high soil moisture and cool temperatures at the start of the spring growing season.

Prolonged vegetation growth also provides cover where fawns can more effectively hide from predators. It also gives voles and mice the thick carpet of grasses they need to make tunnels. Among their many findings, FWP researchers have discovered a relationship between rodent numbers and mule deer fawn survival.

"When vole and mice numbers increase, they're easy for coyotes to catch," says Ken Hamlin, the long-term mule deer study's lead research scientist. "Coyotes concentrate on voles and mice instead of fawns. So, while we can talk about the individual effects of precipitation, often it's the whole ecology that turns on these moisture and growing cycles that then influences wildlife populations."

Hamlin explains that during a sustained drought, soil moisture may be so depleted that even above-average precipitation, such as in spring of 2005, may not produce abundant forage growth.

deer survival in ways that aren't immediately apparent. For example, heavy snowfall covers forage, making it tough for deer to find enough to eat. Deep snow, especially when covered with an icy crust, can also hamper deer movement, but not that of coyotes and other predators. The thin, sharp hooves of deer punch through the ice crust, while the soft pads of coyotes allow the predators to race across the snow pack.

On the other hand, deep snow can also benefit deer. It protects voles from predators, allowing them to breed and produce young during the winter. That provides more alternative prey for coyotes in spring and summer.

"Populations are very difficult to model in precise mathematical terms," Hamlin says. "It's the interaction of all these factors that makes predicting wildlife population numbers almost an art."

Wildlife managers continue to learn how precipitation affects wildlife. And the more they learn, the more accurately they can predict how well wildlife populations are faring—and how much harvest to allow each fall.

"Research investigations like those on sage grouse and mule deer provide us with specific information on environmental conditions and their influence on wildlife habitat," says Herbert. "We then use that information to manage populations and set appropriate hunting seasons. Just as important, studies gather information we provide to the public so that people have realistic expectations for the upcoming fall hunting seasons."

DUCK

DONE DELICIOUSLY

FINALLY, SOME EASY WAYS TO COOK MOUTH-WATERING WATERFOWL DISHES

MY INTEREST in dining on duck began in college. A group of us would cut class on Friday for the waterfowl opener and drive to a northern Minnesota lake covered in wild rice and wild mallards. On return to my apartment, I'd spend hours slowly roasting a duck, basting it in its juices then brushing on a fancy fruit glaze before serving.

Such a time-consuming treatment worked well when I bagged only a few ducks each season. But after my aim improved over the years and I began harvesting more birds each fall, I dreaded the hours-long process of roasting duck dinner. What's more, I could never cook a duck without getting that slight "liver" taste.

Then a friend told me his favorite way to cook these scrumptious birds. It's been a love affair ever since.

"I learned this method by reading how the old-time duck hunters prepared their birds," says Joe Kingman, a longtime North Woods waterfowler. "I decided to try it, and ever since it's been the best way I've found for cooking duck."

BY TOM DICKSON ▪ PHOTOS BY BILL LINDNER

GREAT GRILLING Kingman Duck (shown here basted with optional orange-honey glaze—¼ cup of orange juice mixed with 2 tablespoons of honey) cooks up in an amazing 15 minutes, producing arguably the best duck you've ever tasted.

The method, which I call Kingman Duck, goes as follows:

1. With game shears, cut the backbone from a plucked duck.
2. "Butterfly" the bird by spreading the body cavity and pressing it firmly against the countertop (breaking the breastbone).
3. Sprinkle both sides liberally with salt (preferably sea salt).
4. Slap the duck on a hot grill for—get this!—just ten minutes on one side, then five on the other.

A 15-minute duck? I couldn't believe it either the first time I cooked a bird this way. Then I took a bite from a breast slice: smoky and salty on the outside, pink and slightly bloody on the inside. I'd never tasted duck so good. Since then, I rarely prepare duck any other way.

Why is this easy and speedy recipe so tasty? I later learned the answer from an expert wild game chef: With duck—also with goose and venison—the rarer the meat, the sweeter the meat.

"If you prick your finger and lick the drop of blood, it's sweet," explains Ken Goff, a game cooking expert who for years was executive chef at the renowned Dakota Jazz Club & Restaurant in the Twin Cities. "The same is true with game animals that have rich, red meat. The key is to not overcook the blood, which then turns bitter and gives the meat that 'gamey' taste."

Another reason this method works so well is that by butterflying the duck, you make it flat rather than round, ensuring more even cooking top and bottom. (Grilling spherical shapes results in a burned exterior and raw interior.)

Another expert who advocates cooking waterfowl hot and fast is Eileen Clarke of Townsend, author of several wild game cookbooks, including *Duck & Goose Cookery*, published by Ducks Unlimited. Because she and her husband love to hunt geese, she has developed many delicious ways to cook the big birds.

"The easiest is to barbecue a whole plucked goose on a propane grill," she says. "Our grill has two burners, and I turn just one on and heat the grill to 350 degrees. Then I place the goose over the other burner and put a pan underneath to catch the drippings. In an hour, I've got a perfectly cooked goose with a crispy skin and juicy meat."

DUCK BREAST À LA RITZ

2 boneless, skinless duck breast halves
1/4 C. all-purpose flour
1 egg, beaten
1/2 C. crushed Ritz crackers
1 T. butter
2 t. vegetable oil
Salt
1 oz. cheese (blue or Gruyère, crumbled)

Heat oven to 375 degrees.

Score breasts with a sharp knife, slicing lines 1/4 inch deep in both directions to create a grid.

Place breasts between sheets of plastic wrap and pound gently with a meat mallet until fillets are an even 1/2 inch thick.

Coat with flour. Dip into egg, then into crushed crackers.

In large oven-proof skillet, melt butter and oil over medium-high heat. When butter stops foaming, add coated meat in single layer. Reduce heat slightly and cook just 90 seconds. Flip pieces, salt lightly, and cook another 30 seconds.

Top with cheese and bake 5 minutes. Serve immediately.

—Teresa Marrone (author of *Abundantly Wild*, a book on collecting and cooking wild edibles, northerntrailspress.com)

QUACKER CRUST Duck à la Ritz (above) combines supermarket crackers with crumbled fragrant cheese. Duck burgers (right) are a great way to use every last scrap of your waterfowl harvest.

USING EVERY BIT

It pains me to see hunters breast out a duck or a goose, then throw the rest away like so much trash. It's illegal under the state's wanton waste regulations, disrespectful of the birds, and a poor ethical showing. It's also illogical, because that meat can be prepared to taste great.

I'll admit legs and thighs aren't the easiest parts to prepare. Unlike breast meat, they don't taste good cooked fast and hot. One easy solution is to slow-cook these portions in a little liquid (called braising). Teresa Marrone, a cookbook author in Minnesota, recommends cutting up goose or duck thighs and legs and placing the pieces in a crockpot or in a covered pot placed on the stove or in the oven. Add enough orange juice to soak but not cover the meat, a bit of chopped onion, and a few herbs (such as rosemary).

"Cook that for seven or eight hours over low heat—after first bringing it to a boil—and you'll end up with meltingly tender meat bathed in a sweet, citrusy sauce," Marrone says.

Another great way to use up duck, says Marrone, is to prepare duck burgers (see recipe at right), which works just as well for goose. With this dish, you can consume every last scrap of your bird, including the meat found along the muscular backbone.

Yet another way to enjoy extra waterfowl meat is to add it to the venison you use for sausage. Keep a bag in the freezer to store deboned duck and goose legs and thighs. When it's time to make venison sausage, chop up the waterfowl and add it to the other ingredients. The fowl adds an extra dimension to the taste and ensures not one scrap of duck or goose goes to waste.

"If I must choose among the sports that draw me into the open," wrote the great outdoors writer Gordon MacQuarrie, "it will be duck hunting. No other sport with rods or guns holds so much of mystery and drama. The game comes out of the sky."

Many of us feel about the sport as MacQuarrie did. By preparing the best waterfowl recipes we can find, using as much of our harvest as possible, we pay tribute to these indomitable birds and the marvelous sport they offer.

BROWN SUGAR GOOSE BREAST

4 T. brown sugar
One medium goose breast (snow or lesser Canada, or a large mallard)
1 T. vegetable oil

Place breast on cutting board. With a sharp knife, blade parallel to the board, cut the breast in half to create two flat fillets.

Dry fillets with paper towels.

Lightly oil the barbecue grill.

Heat on high until you can hold a hand just over the grill for no longer than 3 or 4 seconds.

Place both fillets on grill.

Rub 2 T. brown sugar on top of each fillet.

Grill 3 minutes on one side, turn carefully, and grill another 1 minute on the other.

Serve on a bed of wild rice or with parsleyed potatoes.

—Eileen Clarke (riflesandrecipes.com)

DUCK BURGERS

1 lb. skinless duck meat, chilled and cut into 1-inch pieces
4 oz. thick bacon, cut into 1-inch pieces
1/4 small onion, chopped into 1-inch pieces
1/2 t. salt
Pinch of black pepper

Fit hand grinder with fine-cutting plate (or use a food processor). Grind duck first, add bacon, then onion.

In mixing bowl, combine meat mixture with salt and pepper. Mix gently but thoroughly with your hands. Shape into four patties. Grill, broil, or pan-fry until just done, about 4 minutes per side. Serve on toasted buns with hamburger fixings.

Option: Another method that has more of a traditional hamburger taste is to skip the bacon, grind the duck (use only 10 ounces) and onion together, then mix with 8 ounces of ground beef in the mixing bowl with the salt and pepper.

—Teresa Marrone

Tom Dickson, the editor of Montana Outdoors, *says he prefers a lunch of cold grilled mallard over any other. Look for photographer Bill Lindner's (blpstudio.com) new cookbook,* Recipes from Nature, *in early 2006. It will feature waterfowl and other game and wild edible recipes and photographs.*

MICHAEL & PATSY FRIBLEY

TAKING THE HUNT TO A HIGHER LEVEL

DUSANSMETANA.COM

Hunting is hard enough. But doing it with bow and arrow demands even more commitment, knowledge, and skill

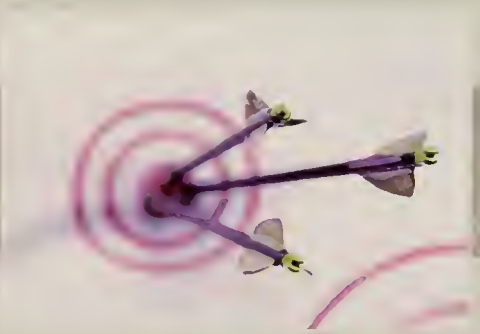
Bowhunting seemingly defies logic. Roughly three of four rifle hunters don't get their elk each season, so why make it even harder by using arrows, rather than bullets? Some die-hard bowhunters may hunt for decades before finally calling in a bull elk close enough for a clear shot. Some never get the chance. Yet bowhunting's popularity grows each year.

Bowhunters say they do it for the challenge. They must stalk (or attract) quarry to within 30 yards or less (some firearms hunters can kill an animal at ten times that distance). Such hunting requires an extraordinary amount of patience, ability, and woodsmanship.

Another appeal is the link to hunting's origins. Though bows have changed, the basic concept of firing a sharply tipped projectile using the energy of bent limbs is still the same as it was when prehistoric bowhunters killed mammoths...

TIM CHRISTIE

SPARTASPHOTO.COM



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This is a silent, solitary sport. No gunfire shatters the backcountry stillness. And few other hunters are afield during the early archery seasons, allowing for privacy impossible during the later gun hunts. Because bowhunters must get so close to their quarry, they become experts at camouflaging themselves and their movements. To be a bowhunter is to disappear, however briefly, into the natural world…

DONALD M. JONES

TIM CHRISTIE

DONALD M. JONES

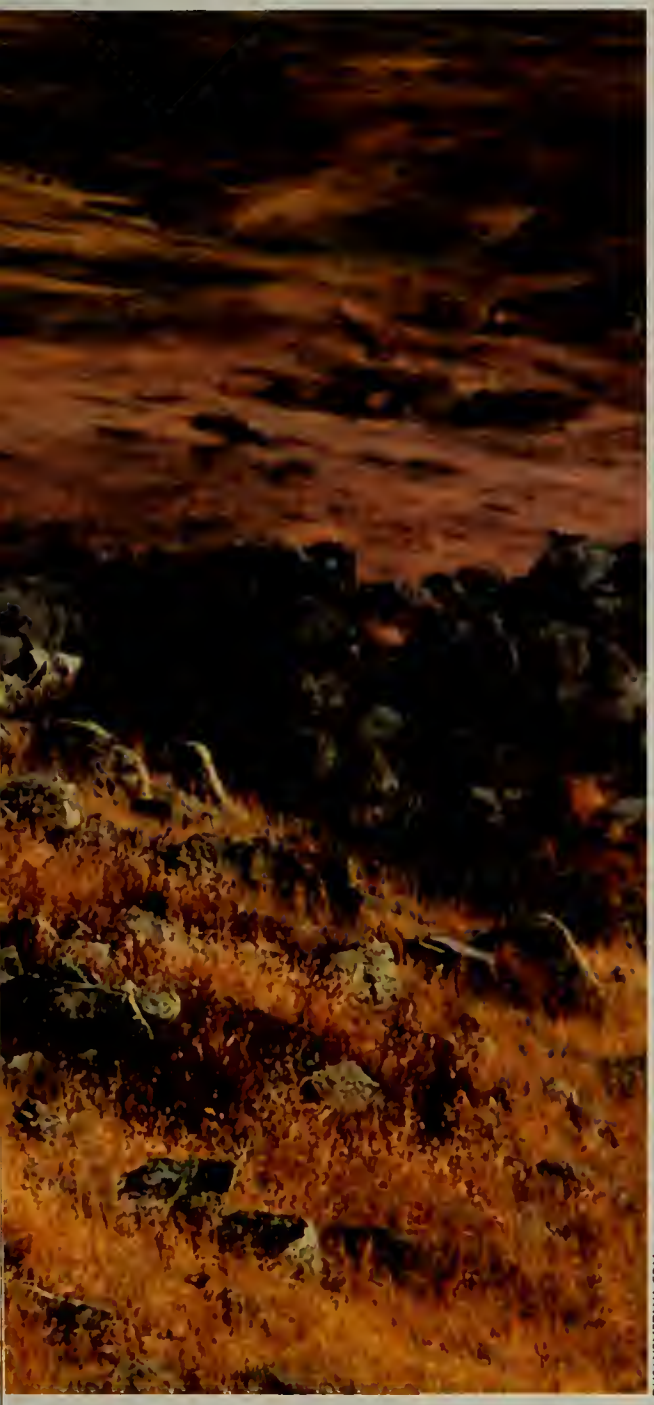
DENVER BRYAN

DONALD M. JONES

CRAIG & LIZ LARCOM

Some archers still use traditional longbows or more advanced recurves. But most depend on compound bows, which have cams and pulleys that make it far easier to hold a draw while waiting for the perfect shot. Such technological advancements have made bowhunters more successful than in years past.

But just barely. There's still no getting around the fact that sneaking close to a wary elk or deer, then finding a clear shot through the thick foliage that hid your approach, is not just a challenge. It's a downright miracle.



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DONALD M. JONES

COOL AND CLEAR WATER, SANDY BEACHES, PICNIC FACILITIES, AND MORE—THE NEW **BRUSH LAKE STATE PARK** MAY BE THE GREATEST THING TO HIT NORTHEASTERN MONTANA SINCE THE INVENTION OF AIR CONDITIONING

Oasis on the Prairie

STATE PARKS PORTRAIT

BRUSH LAKE STATE PARK

From the air, Brush Lake looks like a piece of turquoise tossed on a sand dune.

The intense blue of the lake is entirely out of place in the caramel-colored monotony of wheat stubble that marches to all horizons in this northeastern corner of Montana.

From the ground, 280-acre Brush Lake is no less striking. In an area of the state where the glaciated landscape is pocked with shallow, alkaline prairie potholes, Brush is a deep, clear lake wirh white, sandy beaches surrounded by grass fields and linear stands of spring wheat.

Recently Brush Lake became Montana's 50th state park (and the only one in the state's northeastern region), providing public access to what Elliotr Jensen of nearby Dagmar calls "Montana's best swimming hole east of the mountains."

Jensen likely knows this swimming hole better than anyone. His family once owned the entire lake and last year sold the northern two-thirds to Montana Fish, Wildlife & Parks to develop as a state park. The Jensens have long worked to sell the property to a public agency with the hope the site would be preserved for public use.

TWO BITS A SUIT

Jensen's first paying job was renting towels and bathing suits to swimmers in the 1930s who flocked to Brush Lake on summer afternoons. They came from prairie homesteads and clapboard communities across northeastern Montana during a time when spare change and recreation were luxuries few families could afford. Still, Jensen can recall collecting "two bits" for a swimming

BY ANDREW McKEAN
PHOTOS BY MATT LONG

LOCAL HOT SPOT

In the early 1900s, Brush Lake rocked. Model Ts and dusty pickups filled the parking area as local farmers gathered to swim, eat, dance, and (during Prohibition) partake in refreshments smuggled from Canada. Today, local landowner Elliott Jensen (below), of nearby Dagmar, points to a site on the lake that once held open-air revivals, picnics, baseball games, and bake sales—and may do so again.

PHOTO COURTESY OF ELLIOTT JENSEN

"IN THE PAST, BRUSH LAKE WAS THE PLACE FOR PEOPLE TO GET TOGETHER. I HOPE IT WILL ONCE AGAIN BE SUCH A PLACE." —ELLIOTT JENSEN

suit and use of a tiny changing room in a bathhouse on the shore of the lake, which is located in a fold of the prairie about 4 miles east of Dagmar and just 2 miles from the North Dakota state line.

"On summer weekends, there would be hundreds of people out here swimming and boating and having picnics," says Jensen. "Brush Lake was where people from different communities gathered. There were no good roads back then, just prairie trails, but you'd have people driving 75 miles—three hours each way—from as far away as Scobey just to swim and get together."

The initial attractions of Brush Lake, says Jensen, were its natural assets. More than 60 feet deep and fed by cold springs, the lake stays cool and clear all summer. Unlike the nearby pothole lakes, it doesn't choke with algae or stink of sulphur (locally called "soda") and stagnant water. Because it's located in a depression of the prairie, Brush Lake is partially sheltered from the winds that strafe the surrounding hilltops and ridges. Ringing the shore, the chokecherry and buffaloberry bushes that gave the lake its name provide shade and wild fruit. In the early 1900s prairie homesteaders, many of them first-generation Scandinavian immigrants, found in Brush Lake a gathering place that reminded them of the neighborhood lakes left behind in northern Europe. They got together for open-air revivals, picnics, baseball games, bake sales, and fiery political debates (at the time, far northeastern Montana was strongly influenced by the socialist prairie populism movement.)

It didn't take long for the lake to become a hotspot for nighttime entertainment, too. A huge dance hall was thrown up on the south shore of the lake in 1920. Bootleggers from nearby farmhouses lubricated the social scene with homemade beer and gin smuggled across the Canadian border, just 25 miles to the north.

As many homesteaders went broke and the remaining farms consolidated, the population of northeastern Montana declined, on average about 10 percent for every decade after 1920. Brush Lake's refreshingly cool swimming water continued to draw some visitors. But use of the lake and its facilities (lakeside cabins, a small restaurant, and a group-use pavilion) was limited mainly to summer Bible camps run by a local church, 4-H clubs, and Boy Scout troops. After the church sold the property, public use declined further.

Several groups tried to buy the lake for public use, but none of them were willing to assume the liability risks, says Doug Smith, a Brush Lake booster who grew up nearby on his family's farm.

"Brush Lake is a unique gem," says Smith, a local county planner. "It's been a community gathering place for a century, and many of us felt it should be placed in the public domain. But we didn't have a tool to do that until Fish, Wildlife & Parks came onto the scene."

FINALLY, A PARK

For years Woody Baxter, FWP's state parks manager for northeastern Montana, was in charge of a region with no state parks but plenty of natural, recreational, and cultural assets. In 2001, he convened a volunteer search committee to identify areas suitable as state parks in the northeastern region. Smith was one of a dozen members of the committee, and he helped boost Brush Lake from one of 25 properties under consideration to the group's top pick.

The lake's prospects were further enhanced by a legislative resolution in 2003, sponsored by another local resident, Montana Senator Linda Nelson. Her resolution mandated Brush Lake as FWP's first state park in the northeastern region.

Why all the passion and support for a remote prairie lake nearly in North Dakota?

"There just aren't many 60-foot-deep, spring-fed lakes in eastern Montana," says Smith, who has long studied the unique geological treasure. "From a hydraulic perspective, Brush Lake is more like Yellowstone National Park's Morning Glory Pool than anything. Its source is a huge spring that emanates from an underground aquifer. There is no inlet or outlet, so water leaves the lake either through evaporation or by [seeping] into adjacent White Lake. The evaporation concentrates minerals in the lake, so it's high in the sorts of mineral salts—manganese, calcium carbonate, and sodium sulfate—often found in healing hot springs."

The minerals make Brush Lake inhospitable to fish, which suffocate from calcium deposits on their gills.

"Often, on lakes this size, we see conflicts between anglers and other water recreation-

Andrew McKean is the FWP regional information and education officer in Glasgow. Photographer Matt Long lives in Livingston.

STRANGE PLACE, INDEED Sixty feet deep and refreshingly cool even in midsummer, Brush Lake differs remarkably from the tepid, shallow potholes in most of northeastern Montana. State park designation has reopened the lake to public use so people may enjoy the water, see the colorful mineral deposits that form on shore, and watch kingbirds and other wildlife.

ists, but that won't be a problem here because of the lack of a fishery," says Baxter.

"I think the park will become a destination for divers," he adds. "Unlike most waters in eastern Montana, Brush Lake stays clear throughout the summer."

Divers may even discover clues to the area's geologic history on the lake bottom. Thousands of years ago, the area surrounding Brush Lake was the ancestral valley of the Missouri River. The great river flowed north into Hudson Bay before a series of glaciers scoured the prairie and pushed the Missouri south to its current route. Roughly 13,000 years ago, one of the last glaciers receded and left behind, imbedded on the plain, a chunk of ice the size of a shopping mall. As the ice melted, it formed a bowl that became Brush Lake. In time, a spruce forest grew around the lake. The trees eventually fell into the water, drifted to the bottom, and were covered by thousands of years of wind-blown pollen and dust. Smith says researchers studying core samples have detected spruce trees dating back thousands of years at the base of the lake's silt bottom.

PUBLIC AMENITY

While scientists study Brush Lake's fascinating past, citizen advocates such as Smith work to preserve its future. "There is almost no public land in this corner of Montana," he says. "If you don't have public land, it's hard to develop public amenities. And without amenities, it's hard to reverse our depopulation trend. I'm not saying Brush Lake State Park is the cure for economic development in this part of the state, but it's a good start."

He may be right. According to Larry Swanson, a University of Montana economist, western Montana's recent population explosion and resulting economic growth are partly due to that region's abundant public lands and waters. Many people in eastern Montana are now looking at their plentiful natural resources and thinking about how public lands and waters might

attract newcomers or convince existing residents to stay. Brush Lake may become one of many amenities—including grand vistas, wildlife recreation, and safe surroundings—that keep people from leaving the economically depressed northeastern region.

"Though we definitely hope to attract visitors from all over, we expect the park will be mainly used by folks from around northeastern Montana and western North Dakota who have relatively few nearby public parks," says Baxter. "I think it will be attractive for afternoon swimming and weekend camp-outs, and for people with boats who don't want to drive to Fort Peck Lake. In the fall, I expect to see bird hunters from throughout the state camping there."

Currently, FWP owns only the northern portion of Brush Lake. The southern part is owned by a private trust. Baxter says FWP hopes to eventually have the opportunity to acquire the rest of the lake.

"If we don't have a willing seller at the south end, we still plan to build tent and RV camping facilities, day-use and picnic areas, boat ramps, and boat docks within the property we own," says Baxter. "What I'm anticipating most is construction of a group-use shelter, which I see being used for family reunions, wedding receptions, and meetings of church groups and civic organizations."

Baxter also hopes to eventually add rental cottages, a bathhouse, and a shower facility. Currently, FWP is upgrading the existing road, putting in picnic tables and a gravel parking area, and installing a toilet, a boat ramp, and a boat dock.

FWP's plans for the park extend far beyond the shoreline. The department aims to restore the highlands above the lake's north and west shores to native prairie. A proposed interpretive trail would detail the area's geology, human history, and unique natural history, including the diverse prairie birds and plants.

The diverse local people, however, are what most interest Elliott Jensen. He hopes the state park can again make the site a community gathering place.

"Dagmar will celebrate its centennial in 2006. I can't think of a better birthday present than an old-fashioned community party," says Jensen. "In the past, Brush Lake was the place for people to get together. I hope it will once again be such a place."

If You Go

Open: May 1 through November 30.

Directions: From Plentywood, head south on Montana Highway 16 for 16 miles to the Reserve intersection. Head east on Highway 258 (East Reserve Highway) for 16½ miles, then south on Brush Lake County Road for 1 mile.

Facilities: Picnic tables, toilet, swimming area, boat ramp, boat dock, interpretive signs.

Activities: Swimming, boating, diving, camping, picnicking, wildlife watching, photography, geological study.

For more information: Call the FWP regional parks office at Glasgow (406-228-3707) or go on-line to fwp.mt.gov.

2005 STATE PARKS EVENTS CALENDAR

SEPTEMBER

1 Hot Topics: Upper Missouri River Monument, *Giant Springs State Park, 8 p.m.* Learn why this scenic and wild stretch of the Missouri was designated as a national monument. (406) 727-1212.

2 Interpretive Walks, *Giant Springs State Park, 8 a.m.* Find out what the Missouri River Valley looked like when Lewis and Clark traveled through this area 200 years ago. (406) 727-1212.

2 Star Gazing Under the Caverns Sky, *Lewis & Clark Caverns State Park, 8 p.m.* Telescopes for viewing distant planets and galaxies will be available. (406) 287-3541.

2, 3 Interpretation at Rainbow Falls, *Giant Springs State Park, 1 p.m.* History of the waterfalls at Rainbow Falls Upper Overlook. (406) 727-1212.

3 North Shore Interpretive Hikes, *Giant Springs State Park, 9 a.m.* Learn about native plants, wildlife, and Lewis and Clark history. (406) 727-1212.

3 Star Gazing the Bannack Skies, *Bannack State Park, 9 p.m.* The park will provide telescopes for viewing distant planets and galaxies. (406) 834-3413.

4 From Bears to Buffalo: Animals on the Expedition, *Giant Springs State Park, 1 p.m.* Bring your kids to this fun children's program on animals found and described during the Lewis and Clark Expedition. (406) 727-1212.

7 The Beautiful Blue Heron, *Giant Springs State Park, 12:15 p.m.* Stories and facts about this stately water bird. (406) 727-1212.

8–11 Traditional Trades Week, *Travelers' Rest State Park, 10 a.m.* Demonstrations and hands-on activities of the skills needed to survive in the early 18th century. Reenactments, living history, and interpretive programs. (406) 273-4253.

17, 18 5th Annual Atlatl Competition, *Ulm Pishkun State Park, 10 a.m.* Fling that thing! Have fun learning to throw this 8,000-year-old hunting device. (406) 866-2217.

For more information on parks events, go to fwp.mt.gov/parks or call (406) 444-3764.

SEPTEMBER 7

The Beautiful Blue Heron

Giant Springs State Park, 12:15 p.m.

Four feet tall, with a 6-foot wingspan, the great blue is the largest of North America's 12 heron species. The grand bird is found throughout Montana along streams, rivers, ponds, and reservoirs. Learn more natural history, lore, and mythology at this midday lecture. Call (406) 727-1212.

Tamarack
Larix occidentalis

Tamaracks, also known as larch, are one of the most remarkable trees of the pine family. After the leaves of aspen and other deciduous species fade and die in autumn, the tamaracks turn gold—one of the few conifers to do so. (So strange is this transformation to some of us who did not grow up in tamarack country that I actually thought the forest was dying during my first autumn in northwestern Montana.)

These so-called "evergreens" are deciduous conifers, whose needles lose their chlorophyll, revealing yellow xanthophyll pigments, and then drop to the ground. In fall, every tamarack forest byway becomes a yellow brick road down which you can skip in a haze of glowing splendor. Even on cloudy days, the roads and trails seem sunstruck by the tiny needles, which reflect light yet seem illuminated from within.

All winter the tamaracks stand bare and dark, with bear-hair lichens draping their branches like shrouds. When spring arrives the soft, new needles emerge and create a chartreuse lacework in the treetops. For three or four weeks, the tamaracks' pale green needles distinguish them from the rest of the forest. The needles gradually darken and blend with the other evergreens until October, when once again they light up the woods and trails in a golden glow.

RANGE In Montana, tamaracks grow in the mountains and valleys of the state's northwestern corner, from the western boundary to the Continental Divide in Glacier National Park and then roughly south into the Bitterroot Range. This is a common tree in most of Canada and Alaska and in other northern states from Oregon to New York.

APPEARANCE Tamaracks are tall, reaching over 150 feet high in Montana, with trunks straight as ship masts. (The world record western tamarack, near Seeley Lake, is 153 feet tall and 264 inches around the base.) The craggy bark on older trees is fire resistant. The outside ash gray color hides a rusty orange bark, 4 to 6 inches thick, made of small, itregular scales that can be ptied apart easily. The bark of younger trees is buckskin colored. Twigs are light brown and covered with numerous tiny spurs or short branches.

As is the case with most pine family trees, the lower limbs of mature tamaracks die and drop off, leaving an expanse of clear trunk. The crown is a tall pyramid shape. Limbs grow parallel to the ground.

The light green, flat, narrow needles are only 1 to 1¼ inches long. They grow in bundles of 14 to 30 from the tips of little rough nubbins on the twigs. These great trees bear small, light brown cones, 1 to 2 inches long, with ¼-inch-long seeds.

AGE Years ago I felled a tamarack that had died in a fire that raged through the Swan Valley some time in the early 1900s. I counted 350 rings, putting the tree's origins back to the time of the Jamestown Settlement in Virginia. The fire-scarred behemoths still living in the Swan Valley must now be nearly 450 years old. Ancient tamaracks estimated at more than 900 years old have been reported in some parts of Washington.

ROOTS Unlike the lodgepole pine, fir, and spruce, the tamarack's roots grow deep. In August 1995, a small tornado swept through a thick regrowth forest near Pierce Lake in the Swan Valley. Across several acres of downed trees, the tamaracks were all that remained standing.

WOOD Tamaracks are highly sought as firewood. The orange-colored wood burns hotter than other conifers, and logs split easily. The tree is also used for lumber, posts, and poles.

HISTORY Because even thick fallen tamarack branches can be broken by hitting them on a stump or fallen tree, early American Indians could carry and stack the firewood without an ax or saw. Indians also made wooden tamarack pots by hollowing out large pitchy burls. They used pitch to help heal cuts and bruises, and chewed it to ease sore throats. To relieve coughs and colds, they drank a tea made from the steeped bark. They made a sweet syrup by hollowing out part of the trunk and allowing moisture from the collected sap to evaporate, thus concentrating the thick liquid.

NELSON KENTER

CHRIS SCHNEPF / FORESTRYIMAGES.ORG

BY LORI MICKEN
Lori Micken, a retired high school biology teacher, lives in Livingston.

TAMARACK TROPHY

A stand of yellowing tamarack in northwestern Montana provides cover for a wary whitetail buck. Learn more about this amazing "evergreen" on page 37. And look for the latest research on the northwestern region's whitetails in our November–December issue. Photo by Dušan Smetana.

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